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10/767,168	01/30/2004	Daisuke Nakaya	Q79649	4742

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EXAMINER	
RILEY, MARCUS T	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/767,168	NAKAYA ET AL.	
	Examiner	Art Unit	
	Marcus T. Riley	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *30 January 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-13* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *attached*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities:

Regarding claim 1; claim 1 recites "*scanning direction for individual the imaging heads.*" This appears to be a typographical error. Place the word *"the"* between the words "*for*" and *"individual"* It is assumed for continued examination purposes that is intended to be "*scanning direction for the individual imaging heads.*".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-7, 11, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al. (US 5,072,304 hereinafter Abe '304) in combination with Bromley et al. (US 5,818,610, hereinafter Bromley '610). Abe '610 discloses a plurality of imaging heads arranged along a direction intersecting a predetermined scanning direction, ("*In addition to the rails 2, 2' for main scanning B being secured to the carriage 9', a detecting portion 14 at the position of subscanning D is mounted on the carriage 9'. The detecting portion 14 comprises on a group of photoelectric conversion elements such as linear CCDs of a*

plurality of bits image forming means such as a lens array for projecting..." column 4, lines 18-24).

However, Abe '610 does not teach imaging heads moving relative to a respective imaging surface in the scanning direction along the imaging surface where pixel update timings of the imaging heads are alterable in at least the scanning direction for the individual imaging heads. Bromley '610, in the same field of endeavor of optical scanners ("*The present invention relates to optical scanners* column 1, line 4) teaches imaging heads moving relative to a respective imaging surface in the scanning direction along the imaging surface, wherein pixel update timings of the imaging heads are alterable in at least the scanning direction for the individual imaging heads ["*A sliding carrier 34 is disposed on track 22 for sliding lengthwise (vertically) along track 22. A scanner 36 is attached to carrier 34, whereby scanner 36 travels along track 22. Scanner 36 is a CCD (change coupled device) which preferably reads a 1.times.1680 pixel area and provides a continuous video output (a linear image signal) indicative of the area read (a scanned line area).*" column 3, lines 41-47].

It would have been obvious at the time the invention was made to one of ordinary skill in the art to combine the optical scanner as taught by Abe '304 and the teachings of Bromley '610, because the invention relates to an improved scanner frame having an optical scanner. ("*The present invention relates to an improved scanner frame having an optical scanner.*" Bromley '610 at column 1, lines 5&6).

Regarding claim 2; Bromley '610 discloses a plurality of imaging elements and the alteration of a pixel update timing is implemented by altering an imaging timing by a duration which is determined by a ratio between a spacing error of an imaging element in

the scanning direction and a scanning speed ("*A sliding carrier 34 is disposed on track 22 for sliding lengthwise (vertically) along track 22. A scanner 36 is attached to carrier 34, whereby scanner 36 travels along track 22. Scanner 36 is a CCD (change coupled device) which preferably reads a 1.times.1680 pixel area and provides a continuous video output (a linear image signal) indicative of the area read (a scanned line area).*" column 3, lines 41-47);

Regarding claim 3; Abe '304 discloses the alteration of the imaging timing is implemented by retarding the imaging timing ("*At a timing 52, the reading head 1 is moved in the subscanning direction (D). At a timing 53, the reading head 1 is moved in the main scanning direction (B), and at a timing 55 the reading of the document S is effected by the group of CCDs.*" column 5, lines 48-51);

Regarding claim 4; Abe '304 discloses the alteration of the imaging timing is implemented by advancing the imaging timing ("*At a timing 52, the reading head 1 is moved in the subscanning direction (D). At a timing 53, the reading head 1 is moved in the main scanning direction (B), and at a timing 55 the reading of the document S is effected by the group of CCDs.*" column 5, lines 48-51);

Regarding claim 5; Abe '304 discloses a plurality of imaging elements which are two-dimensionally arranged in a plane which is substantially parallel to the imaging surface, and the imaging head is rotatable about a line perpendicular to the imaging surface ("*The reading head 1 is secured to a driving force transmitting portion 6, such as a wire, for main scanning (directions B and E). The driving force transmitting portion 6 for main scanning is trained between pulleys 7, 7' and is moved by means of the rotation*

of a pulse motor 8. As the pulse motor 8 rotates in the direction of the arrow A, the reading head 1, while moving in the direction of the arrow B, reads the line information of the document S, which is perpendicular to the main scanning direction B, by means of a number of bits corresponding to a group of photoelectric conversion elements." column 3, lines 45-55);

Regarding claim 6; Abe '304 discloses wherein a scanning speed in the scanning direction is alterable ("*After only a necessary width of the document S has been read, the main scanning pulse motor 8 rotates in the opposite direction of the arrow A. Consequently, the reading head 1 moves in the direction of E and is reset to its initial position. Carriages 9, 9' slide on guide rails 10, 10' for the subscanning direction D which is substantially perpendicular to the main scanning direction B. The carriage 9' is secured to a driving force transmitting portion 12 for the subscanning direction (D), such as a wire, which is trained between pulleys 11, 11' by means of a fixing member 13.*" column 3, lines 62-68 thru column 4, lines 1-4);

Regarding claim 7; Abe '304 discloses a modulated light irradiation apparatus which irradiates light, which is modulated at each of pixels in accordance with image information, at an exposure surface which includes the scanning surface ("*...the reader shown in FIG. 9 lights the exposure lamp 503. The reflected light which has irradiated the document forms an image on the CCD line sensor 506 by means of the lens 505.*" column 11, lines 55-58);

Regarding claim 11; Abe '304 discloses an imaging head unit including a plurality of imaging heads arranged along a direction intersecting a predetermined

scanning direction, ("*In addition to the rails 2, 2' for main scanning B being secured to the carriage 9', a detecting portion 14 at the position of subscanning D is mounted on the carriage 9'. The detecting portion 14 comprises on a group of photoelectric conversion elements such as linear CCDs of a plurality of bits image forming means such as a lens array for projecting...*" column 4, lines 18-24).

Bromley '610 discloses the imaging heads moving relative to a respective imaging surface in the scanning direction along the imaging surface, and pixel update timings of the imaging heads being alterable in at least the scanning direction for individual the imaging heads and a movement apparatus which relatively moves the imaging head unit in the predetermined scanning direction [*"A sliding carrier 34 is disposed on track 22 for sliding lengthwise (vertically) along track 22. A scanner 36 is attached to carrier 34, whereby scanner 36 travels along track 22. Scanner 36 is a CCD (change coupled device) which preferably reads a 1.times.1680 pixel area and provides a continuous video output (a linear image signal) indicative of the area read (a scanned line area).*" column 3, lines 41-47]

Regarding claim 12; Bromley 610' discloses relatively moving an imaging unit, which includes the imaging head unit, along the imaging surface in the predetermined scanning direction for imaging, altering pixel update timings for individual the imaging heads in accordance with a scale factor difference, and implementing a conversion of an imaging scale factor in at least the scanning direction ([*"A sliding carrier 34 is disposed on track 22 for sliding lengthwise (vertically) along track 22. A scanner 36 is attached to carrier 34, whereby scanner 36 travels along track 22. Scanner 36 is a CCD (change*

coupled device) which preferably reads a 1.times.1680 pixel area and provides a continuous video output (a linear image signal) indicative of the area read (a scanned line area)." column 3, lines 41-47];

Regarding claim 13; Bromley '610 discloses a relatively moving an imaging unit, which includes the imaging head unit, along the imaging surface in the predetermined scanning direction for imaging (("*In addition to the rails 2, 2' for main scanning B being secured to the carriage 9', a detecting portion 14 at the position of subscanning D is mounted on the carriage 9'. The detecting portion 14 comprises on a group of photoelectric conversion elements such as linear CCDs of a plurality of bits image forming means such as a lens array for projecting...*" column 4, lines 18-24); and altering pixel update timings for individual the imaging heads in accordance with a scale factor difference and implementing a conversion of an imaging scale factor in at least the scanning direction (["*A sliding carrier 34 is disposed on track 22 for sliding lengthwise (vertically) along track 22. A scanner 36 is attached to carrier 34, whereby scanner 36 travels along track 22. Scanner 36 is a CCD (change coupled device) which preferably reads a 1.times.1680 pixel area and provides a continuous video output (a linear image signal) indicative of the area read (a scanned line area).*" column 3, lines 41-47];

4. **Claim 8** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Abe '304 and Bromley '610, as applied above to claim 1, and further in view of Enomotto et al. (US 5,933,183 hereinafter Enomotto '183).

Regarding claim 8; The combination of Abe '304 and Bromley '610, does not expressly teach 1) laser device which irradiates laser light 2) a spatial light modulation element at which numerous imaging element portions, which respectively alter light modulation states in accordance with control signals, are arranged in a two-dimensional arrangement, the spatial light modulation element modulating the laser light irradiated from the laser device, or 3) a control section which controls the imaging element portions by the control signals, which are generated in accordance with the image information.

Enomotto '183 teaches a laser device which irradiates laser light ("*A spatial light modulator has a function of deflecting a propagation direction of incident light, and so it is used, for example, as an on/off controller of a laser optical system for controlling propagation of a laser beam.*" column 1, lines 16-19.); a spatial light modulation element at which numerous imaging element portions, which respectively alter light modulation states in accordance with control signals, are arranged in a two-dimensional arrangement, the spatial light modulation element modulating the laser light irradiated from the laser device ("*As shown in FIG. 11, a data write control circuit 72 reads one line image data for each color from the line memory 71. Synchronously with a write timing signal from the controller 71, the data write control circuit 72 sequentially writes as mirror drive data one bit after another, starting from the highest bit of each image data set, into memory cells 7 of the color spatial light modulator 10.*" column 7, lines 51-57); a control section which controls the imaging element portions by the control signals, which are generated in accordance with the image information ("*As shown in FIG. 11, a data write control circuit 72 reads one line image data for each color from the line memory 71. Synchronously with a write timing signal from the controller 71, the data write control*

circuit 72 sequentially writes as mirror drive data one bit after another, starting from the highest bit of each image data set, into memory cells 7 of the color spatial light modulator 10." column 7, lines 51-57);

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the modulated light irradiation apparatus which irradiates light, as taught by the combination of Abe '304 and Bromley '610 and modify it to a "a laser device which irradiates laser light" as required by Enomotto '183, so that the spatial light modulator printer can be capable of dispensing with a rotatable color filter disk as taught by Enomotto '183 ("*It is a principal object of the present invention to provide a color spatial light modulator capable of dispensing with a rotatable color filter disk.*" Enomotto '183 at column 2, lines 37-39).

5. **Claim 9** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Abe '304, Bromley '610 and Enomotto '183 as applied above to claim 8, and further in view of Kito (US 6,900,825 B2, hereinafter Kito '825).

Regarding claim 9; the combination of Abe '304, Bromley '610 and Enomotto '183 does not expressly teach a micromirror device which includes numerous micromirrors arranged in a two-dimensional arrangement, angles of reflection surfaces of which micromirrors are respectively alterable in accordance with the control signals. Kito '825 discloses a micromirror device which includes numerous micromirrors arranged in a two-dimensional arrangement, angles of reflection surfaces of which micromirrors are respectively alterable in accordance with the control signals ("*A controller controls the spatial light modulator, and according to the image data, sets micromirrors in one first*

group in the spatial light modulator to the first position, sets micromirrors in a second group in the spatial light modulator to the second position except for the first group, to modulate the light by reflection on the first group, for indication of the simulated image with the indicating projecting optical system, and also according to the image data..." column 2, lines 60-67).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the image apparatus as taught by the combination of Abe '304, Bromley '610 and Enomotto '183 and modify it to an image apparatus with a micromirror device as required by Kito '825, so that the device may have a small size and operate at high speed. ("*...the present invention relates to a printer and projector which is equipped with a micromirror device, can have a small size and can operate at high speed.*" see Kito '825 at column 1, lines 9-12).

6. **Claim 10** is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Abe '304, Bromley '610, Enomotto '183 and Kito '825 as applied above to claim 9, and further in view of Johnson (US 6,133,986, hereinafter Johnson '986).

Regarding claim 10; the combination of Abe '304, Bromley '610, Enomotto '183 and Kito '825 does not expressly teach a liquid crystal shutter array which includes numerous liquid crystal cells arranged in a two-dimensional arrangement, which are respectively capable of blocking transmitted light in accordance with the control signals. Johnson '986 discloses a liquid crystal shutter array which includes numerous liquid crystal cells arranged in a two-dimensional arrangement, which are respectively capable of blocking transmitted light in accordance with the control signals [("*With the bi-*

directional raster scan (FIG. 4) the image surface is divided into an array of square or rectangular cells with cell dimensions matching the microlens center spacing, and the surface is scanned bi-directionally so that each focal point 15 scans a pattern of raster lines covering a single cell 16." column 5, lines 24 - 29) see also column 17, lines 64-67 thru column 18, lines 1-3, ("*The image source could, for example, be a film transparency or a liquid crystal device (LCD). However, reflective media have the advantage that the illumination can be focused down to an array of very small pixel elements by means of an object-plane microlens array in close proximity to the light-modulating elements (as in FIGS. 22 and 23).*"].

It would have been obvious at the time the invention was made to one of ordinary skill in the art to utilize the image device as taught by the combination of Abe '304, Bromley '610, Enomotto '183 and Kito '825 and modify it to a liquid crystal shutter array which includes numerous liquid crystal cells arranged in a two-dimensional arrangement as required by Johnson '986, because this system makes possible flat field, distortion-free imaging, with accurate overlay, focus, and warp compensation, over very large image fields ("*The system makes possible flat field, distortion-free imaging, with accurate overlay, focus, and warp compensation, over very large image fields (larger than the practical limits of conventional imaging means).*" see Johnson '986 "*Abstract*").

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marcus T. Riley whose telephone number is 571-270-1581. The examiner can normally be reached on Monday - Friday, 7:30-5:00, est.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Twyler Lamb can be reached on 571-272-7406. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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